



1. ALLELOPATHY: IT'S INTERFACE IN TREE-CROP ASSOCIATION

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ABSTRACT: Combination between tree and crops interacts dynamically and provides multi-faceted aspects of improvement such as increased productivity, enrichment of soil with organic matter and nitrogen, transport of nutrients from lower to the upper layer of soil, conservation of environment, improved microclimate and allelopathy is one amongst them when it comes to combine the both components for sustainable land use and to increase food production. Because these components co-exist simultaneously, their allelopathic compatibility may be decisive to determine the selection of successful tree-crop combination. Mostly trees have negative allelopathic effects on crops, therefore, it is essential to explore that what type of tree-crop interaction will have no or positive allelopathic effects on the companion crops may be combined for beneficial results. As trees remain a part of the agroforestry system for a longer period, and most of them produce a large amount of leaves and litter, their allelochemicals may play an important role in an overall improvement. If the due emphasis is given, allelopathy could play a major role in enhancing the production and productivity in agroforestry systems by having the better understanding about tree-crop combination.

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2. COMBINATIONAL IMPACT OF *Debaryomyces hansenii* BIOAGENT AND 1-METHYLECYCLOPROPEN (1-MCP) ON SHELF LIFE AND QUALITY ATTRIBUTES OF KINNOW MANDARIN

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ABSTRACT: Due to rising consumers' concern over chemical/pesticides residue free eatables and international food safety laws, it is felt world wide to find out an alternative approach for postharvest food loss reduction and quality retention. To find out safe postharvest treatment alternatives, Kinnow mandarin fruits were treated individually with 1-MCP (250 nl L⁻¹), *Debaryomyces hansenii* (10⁹ cfu ml⁻¹ for 2 minutes) and their combination (250 nl L⁻¹ + 10⁹ cfu ml⁻¹). Treated fruits were stored at 10°C temperature and 85% RH. Their impact on pathological, physical and quality parameters was investigated after 45 days storage. Fruits treated with 1-MCP (250 nl L⁻¹) + *Debaryomyces hansenii* bioagent (10⁹ cfu ml⁻¹) resulted in minimum incidence of moulds (green 3.61% and blue 2.05%) over all natural decay (7.25%) and higher sensory score (7.50). Higher fruit firmness and lower PLW was recorded equally good with 1-MCP alone and in combination of *Debaryomyces hansenii* bioagent. Postharvest fruit quality parameters viz TSS, acidity, total sugars and vitamin C content were not affected with the 1-MCP and *Debaryomyces hansenii* either alone or in combination.

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3. STUDIES ON GENETIC VARIABILITY AND CHARACTERS ASSOCIATION OF FRUIT QUALITY PARAMETERS IN TOMATO

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ABSTRACT : The genetic variability and characters association of different fruit quality parameters were studied in 15 tomato genotypes grown in a two year field experiments. High and moderate to high GCV and PCV were recorded for number of locules / fruit, fruit weight, total acid (%), number of fruits/plant, vitamin C (mg /100g), fruit yield /plant, fruit length and pericarp thickness. High and moderate to high heritability coupled with high and moderate to high genetic gain in number of locules/fruit, fruit weight, fruit length, number of fruits/plant, pericarp thickness, vitamin C (mg/100g) and total acid (%) indicated the predominance of additive gene action, and therefore, these are more reliable for effective selection. Correlation coefficient revealed that fruit yield per plant was positively and significantly correlated with pericarp thickness, fruit length, fruit weight and number of fruits/plant indicating relative importance of these characters for yield improvement. Significantly positive and negative associations among different fruit quality parameters were also observed in the present study. The path coefficient analysis revealed that number of locules /fruit, TSS, fruit length, number of fruits/plant, fruit weight, vitamin C content and pericarp thickness had positive direct effect on fruit yield, while fruit width and total acid content had strong negative effects on the fruit yield.

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4. EFFECT OF DIFFERENT PACKAGINGS ON QUALITY OF PEACHES DURING STORAGE

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ABSTRACT: Physiochemical and enzymatic changes in the peach fruits packed in corrugated cardboard boxes of 2 kg and 4 Kg and traditional wooden boxes of 4 Kg and 8 Kg were studied during cold storage (0-2°C with 85-90 per cent R.H.). The CFB boxes was proved very effective in reducing spoilage, physiological loss in weight (PLW) and maintaining acidity, total phenols content and pectin methyl esterase (PME) activity during storage. There was an increase (p 0.05) in spoilage, PLW, TSS, reducing sugars and PME activity and decrease (p 0.05) in acidity and total phenols content during storage. The fruits packed in 2 kg CFB boxes were best in terms of quality parameters followed by 4 kg CFB boxes. Results revealed that peach fruits packed in 2 kg CFB boxes can be stored for three weeks in cold storage (0-2°C, 85-90% RH) with acceptable edible quality of fruits and can be substituted for wooden boxes due to its demonstrated benefits.

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5. GENETIC VARIABILITY AND CORRELATION ANALYSIS IN BER (*Zizyphus mauritiana* Lamk.) GERMPLASM GROWN IN LUCKNOW

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ABSTRACT: A study was conducted in sodic soil conditions of Lucknow during 2005-2006 using 16 genotypes of *Zizyphus mauritiana* Lamk. in which 12 were commercial cultivars viz. Banarasi Karaka, Karali, Shootless, Mehru, Peundi, Gola, Jaffran, Chhuhara, Khinni, Desi, Kaithli and Illaichi; and 4 selections-i.e. Ambedkar Ber 1, Ambedkar Ber-2, Ambedkar Ber-3 and Ambedkar Ber-4 to correlate 13 physico-chemical characters of fruits i.e. fruit length, fruit width, fruit weight, fruit volume, specific gravity, total soluble solid (TSS), acidity, ascorbic acid, stone length and stone width, stone weight, pulp: stone ratio and fruit pulp. The experiment was carried out in completely randomized design (CRD) with three replications. Correlation analysis study showed a high positive and statistically significant ($P<0.01$) correlation between fruit pulp and fruit weight (0.999). Fruit pulp also had positive and significant correlation with fruit volume (0.874) and fruit width (0.730). Fruit volume indicated negative correlation with specific gravity. Therefore, information on different physico-chemical characters of fruits and fruit pulp yield may be of great importance to a breeder in selecting a desirable genotype.

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6. EMBRYO CULTURE AND DEVELOPMENT OF SEEDLINGS IN DIFFERENT CITRUS SPECIES

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ABSTRACT: The citrus industry is considered to be a major fruit industry hence it needs to be improved to cater to the diverse needs of consumers and crop breeders. Genetic manipulation through conventional techniques in this genus is invariably a difficult task for plant breeders as it poses various biological limitations comprising long juvenile period, high heterozygosity, sexual incompatibility, nucellar polyembryony and large plant size that greatly hinder cultivar improvement. The demands for elite rootstock material are continuously increasing for fruit production and to fulfill such demands application of *in vitro* propagation techniques is one of the successful alternative particularly in case of citrus crops. One of the essential requirements for the successful application of plant propagation technology in agriculture is its capacity to regenerate elite plantlets. The process of embryo culture is a suitable method of micropropagation and has the potential of mass propagation commercially. Keeping in mind these things experiment on "Embryo culture and development of seedlings in different *Citrus species*" was conducted. The seeds were extracted from the developing fruits from the trees growing in the college nursery and were sterilized. The embryos of six *Citrus species* were cultured to obtain the stock plants. The germination ranged from 71.5 to 96.0 per cent and the embryos were inoculated on the basal Murashige and Skoog medium. *Citrus limon* gave the maximum (96 per cent) germination and *Citrus sinensis* resulted in minimum (71.5 per cent) germination. It was concluded from the experiment that *in vitro* propagation has been a great potential tool to overcome problems related with the field culture for citrus species. These advances in biotechnology have generated new opportunities for citrus

genetic improvement. Therefore, development of efficient embryo culture protocols is necessary for conservation and genetic improvement of citrus.

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7. EFFECTS OF DRIP IRRIGATION AND POLYTHENE MULCH ON PRODUCTIVITY AND QUALITY OF STRAWBERRY (*Fragaria ananassa*)

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ABSTRACT: A field trial was conducted under farmer's participatory research project at farmers' field in the Bhojpur district of Bihar on clay loam soil to improve strawberry (*Fragaria ananassa*) productivity and quality through drip irrigation and polythene mulch and to enhance water use efficiency through pressurized irrigation coupled with use of black polythene mulch along with surface irrigation. Drip irrigation with polythene mulch gave significantly highest yield (50.10 q ha^{-1}) as compared to surface irrigation in an unmulched condition (40.15 q ha^{-1}) however, the yield under paddy straw (45.90 q ha^{-1}) and unmulched (42.07 q ha^{-1}) was next in order to drip with polythene mulch but were significantly at par among themselves. When calculated the percentage increase the drip with polythene mulch gave 25 per cent higher yield than surface with unmulched condition. Similarly, the water use efficiency (WUE) was highest in drip irrigation with polythene mulch ($7.7 \text{ kg ha}^{-1} \text{ mm}^{-1}$) as compared to surface irrigation ($5.1 \text{ kg ha}^{-1} \text{ mm}^{-1}$). The fruit yield of strawberry under drip irrigation was found to be 46.07 q ha^{-1} compared to 40.15 q ha^{-1} under surface irrigation. Moreover, polythene mulch plus drip irrigation further raised the yields. Fruit weight increased significantly while other analyzed quality characteristics did not differ significantly among treatments. Drip irrigation besides giving a saving of 50-55 % irrigation water resulted in 20-40 % higher yield of crops studied.

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8. INFLUENCE OF PACLOBUTRAZOL AND ETHEPHON ON FRUIT QUALITY OF 'ALLAHABAD SAFEDA' GUAVA

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ABSTRACT: Investigation on 4-year old plants of guava cv. Allahabad Safeda was conducted to find out the influence of gibberellin-inhibitor paclobutrazol (PBZ), [(2RS, 3RS)-1-(4-chlorophenyl)-4,4-dimethyl-2-(1,2,4 triazol-1-yl)pentan-3-ol] and ripening promoter ethephon [(2-chloroethyl) phosphonic acid], on fruit quality. Treatments in the form of foliar application were applied repeatedly during March 2007 and 2008 at 500 and 1000 ppm of each chemical on plants at 6x5m spacing. Fruit size and weight was recorded higher in all treated plants during both rainy and winter seasons as compared to untreated plants. Number of seed was counted highest in fruits obtained from control plants during both seasons. Pulp proportion was not affected significantly with treatments. The palatability rating and TSS of fruits during both rainy and winter season were recorded higher and acidity was recorded lower in treated plants as compared to untreated plants. Highest vitamin C content was noted in fruits obtained from ethephon 1000 ppm treated plants during rainy season and ethephon 500 ppm during winter season. Although, PBZ 500 ppm was found to increase the fruit size and weight particularly during rainy season but ethephon 500 ppm treated plants provided fruits with best eating quality.

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9. GENETIC VARIABILITY, HERITABILITY, GENETIC ADVANCE, CORRELATION AND PATH ANALYSIS IN OKRA

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ABSTRACT : A field experiment was conducted with twenty diverse genotypes of Okra (Pusa Makhamali, VRO-6, VRO-5, Selection-10, IIVR-10, HRB-10, IIVR-11, Perkins Long Green, VRO-4, HRB-9-2, Parbhani Kranti, RS-410, Punjab-7, DOV-91-4, D-1-87-1, EMS-8-1, Bhindi Vaphy, 315, and BO-2) in randomized block design with three replications. Analysed data revealed that among all the genotypes, Pusa Makhamali, Perkins Long Green, Parbhani Kranti, VRO-6, VRO-5 and Selection-10 gave promising results.

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10. BIOCHEMICAL CHANGES IN GUAVA FRUITS DURING STORAGE AS AFFECTED BY DIFFERENT METHODS OF HARVESTING FROM DIFFERENT POSITION OF TREE

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ABSTRACT: A study was carried out on the effect of position of the canopy and different methods of harvesting of guava to evaluate its chemical as well as mineral quality at the different period of storage. Matured healthy fruits of guava cv. 'Pant Prabhat' with uniform size were harvested with and without peduncle and with one leaf pair with the help of secateur to analyze the post harvest behaviour of fruit after three and seven days of storage. Time of maturity was influenced by position of fruits. Fruits from lower tree canopy mature earlier than rest of the canopy. There was also a variation in chemical as well as mineral quality between different canopy positions on tree. Calcium and potassium contents were higher in upper canopy positions than lower canopy fruits. Fruits should be harvested lower layer of fruit tree canopy for better quality as well as storage. Therefore, at the time of harvesting guava the pedicel should remain attached to its fruit for better storage quality.

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11. STANDARDIZATION OF BENCH GRAFTING IN CUSTARD APPLE (*Annona squamosa* L.)

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ABSTRACT : An experiment on bench grafting in custard apple (*Annona squamosa* L.) employing cleft grafting technique was conducted at Indian Grassland and Fodder Research Institute, Jhansi during 2007. Bare rooted stocks of custard apple having 0.6 cm diameter were bench grafted with dormant scion of cv. *Balanagar*. Dormant scion shoots having 0.6 cm thickness used for grafting has given highest graft success (96.4%) when it was performed during 29th May, whereas minimum (37.8%) was recorded when 0.8 cm thick scion was grafted on 6th June. Days taken to sprouting, length of sprout, collar diameter, number of secondary branches and number of secondary roots per plant were significantly influenced by scion thickness and time of grafting.

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12. EFFECT OF PRE-HARVEST TREATMENTS OF CALCIUM SALTS ON HARVEST MATURITY IN KINNOW MANDARIN

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ABSTRACT : The present study was undertaken at Punjab Government Progeny Orchard and Nursery, Attari, Amritsar, to judge the efficacy of different levels of Calcium Chloride (CaCl_2) and Calcium Nitrate [$\text{Ca}(\text{NO}_3)_2$] for retaining the fruit quality during delayed harvesting. There were six chemical treatments and the experiment was replicated three times. The fruits from the trees were harvested at different stages of maturity (1st January, 15th January, 1st February and 15th February) and were subjected to physico-chemical evaluation. On the basis of two years observation, Calcium Chloride (CaCl_2) at 6 per cent and Calcium Nitrate [$\text{Ca}(\text{NO}_3)_2$] at 0.3 per cent proved their effectiveness in delaying the harvest maturity of the fruits. However, the TSS, total sugars and reducing sugars level of these treated fruits was found to be lower in comparison to control. The acidity level was recorded to be higher than control.

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13. EFFECT OF NUTRIENT MANAGEMENT THROUGH ORGANIC SOURCES ON THE PRODUCTIVITY OF GUAVA (*Psidium guajava* L.)

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ABSTRACT : The experiment was conducted to study the effect of nutrient management through organic sources on guava trees. Results showed that application of various organic substances increased growth of trees, fruit yield and fruit quality as compared to untreated ones (control). The highest values of these parameters were recorded for trees applied with poultry manure followed by the trees applied with FYM. Application of poultry manure on guava trees significantly increased number of fruits per plant and resultantly higher yield (kg/tree) was achieved as compared to control.

The recorded values of total soluble solids and total sugar were also found significantly higher with the application of poultry manure.

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14. EFFECT OF CYCOCEL ON GROWTH, YIELD AND QUALITY OF TOMATO (*Lycopersicon esculentum* MILL.)

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ABSTRACT: The yield of any crop is influenced by a number of factors. Therefore, an investigation was carried out to determine the effect of different rates of Cycocel on growth, yield and quality of tomato. The findings carried out on tomato, revealed that the application of cycocel at 300 ppm brought about the best results. Cycocel as retardant (CCC) exhibited the capacity for profuse branching, higher leaf count, higher flower cluster and better yield per plant as compared to control.

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15. STANDARDIZATION OF STONE GRAFTING IN SOME MANGO CULTIVARS UNDER LUCKNOW CONDITIONS

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ABSTRACT : The present investigation was carried out during 2005- 2006 at the Horticultural Research Farm of Babasaheb Bhimrao Ambedkar University, Lucknow. The experiment was conducted using six varieties viz. Amrapali, Dashehari, Mallika, Langra, Chausa and Lucknow Safeda in a Randomized Block Design with five replications. Results reflect that the highest success per cent and over all performance of stone grafting operations was recorded by using scion stick cultivar Amrapali, whereas minimum success per cent was in cultivar Lucknow Safeda under Lucknow conditions.

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16. STUDY ON GENETIC VARIABILITY AND HERITABILITY IN *Ocimum* spp.

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ABSTRACT: A field experiment was conducted during *kharif* season of 2008 to study the variability of 25 genotypes of *Ocimum* spp. for 11 traits. The estimate of maximum range and coefficient of variability were noted for six different characters including plant height, leaf length, no. of inflorescence/plant, length of inflorescence, days to maturity and fresh herb yield /plant. The highest estimates of heritability in broad sense were observed for plant height (99.70 %) followed by length of inflorescence /plant (98.80 %), fresh herb yield per plant (98.60%), no. of inflorescence/plant (98.40%), days to maturity (92.60%) and leaf width (91.50%). The highest value of genetic advance was obtained for fresh herbage yield per plant (1018.02) followed by dry herb yield per plant (394.31), no of inflorescence/plant (43.76) and plant height (39.13). Highest values of genotypic and phenotypic covariance indicated wide range of variability and high heritability associated with higher values of relative genetic advance.

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17. EFFECT OF NITROGEN AND PHOSPHORUS ON CROP GROWTH, HEAD YIELD AND QUALITY OF BROCCOLI (*Brassica oleracea* L. var. *italica*)

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ABSTRACT: An experiment was conducted at Department of Vegetable Science, C.S. Azad Univ. of Agri. & Tech., Kalyanpur, Kanpur during *Rabi* season of 2005-06 to find out the effect of nitrogen (30, 60, 90, 120 kg ha⁻¹), phosphorus (30, 60, 90 kg ha⁻¹) on crop growth, head yield and quality of broccoli. The significant result was obtained in growth and yield parameter, *i.e.*, height of plant, days to central head, head yield per plant and per plot, plant frame, head size, harvest duration and compactness of the head. The most of the characters and optimum head yield of broccoli were favoured by applying 90 kg nitrogen and 90 kg phosphorus per hectare.

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Research Note :

**18. STANDARDIZATION OF PLANT MULTIPLICATION IN AONLA (*Emblca officinalis* Garten.)
CV. NARENDRA AONLA-6**

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ABSTRACT: Field experiment conducted to standardize the optimum stock thickness, budding height and method of budding in aonla cv. N.A. 6 concluded that Narendra Aonla-6 should be budded on 0.5 cm thickness or rootstock at 10 cm height above ground level with patch method of budding during the month of June for higher budding success and further growth of budding.

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**19. RUSSIAN OLIVE (*Elaeagnus angustifolia* L.): PROBABLE ORNAMENTAL PLANT FOR
BIO-AESTHETIC LANDSCAPING IN COLD ARID ECOSYSTEM**

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20. GROWTH AND SEED YIELD OF FENNEL AS INFLUENCED BY *RHIZOBACTERIA*

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**21. EVALUATION OF TARO (*Colocasia esculenta* var. *antiquorum*) GENOTYPES AGAINST LEAF
BLIGHT (*Phytophthora colocasiae*) UNDER EASTERN UTTAR PRADESH CONDITION**

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22. POPULATION DYNAMICS OF ORIENTAL FRUIT FLY, *Bactrocera dorsalis* (Hendel) IN RELATION TO ABIOTIC FACTORS

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**23. EFFECT OF NPK LEVELS ON GROWTH, YIELD AND QUALITY OF OKRA CV. ARKA
ANAMIKA**

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